

### **REMARKS**

This responds to the Office Action mailed on November 18, 2003.

Claims 1, 9, 14, 22, 30, 51, and 55 are amended, no claims are canceled, and no claims are added; as a result, claims 1, 2, 4-10, 12-15, 17-23, 25-31, 33-37, 51, 52, and 55-56 remain pending in this application.

### **Information Disclosure Statement**

Applicant respectfully requests that a copy of the 1449 Forms, listing all references that were submitted with the Information Disclosure Statements filed on June 17, 2003 and on October 15, 2003, marked as being considered and initialed by the Examiner, be returned with the next official communication.

### **§103 Rejection of the Claims**

Claims 1-2, 4, 14-15, 17, 51-52, and 54-56 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 0060020024A) in view of Park (U.S. 5,795,808), or Takeoka (U.S. 4,647,947) or Thomas (U.S. 4,920,071) and Ma (US 006207589 B1).

Claims 22-23, 25, 30-31, and 33 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 0060020024A) in view of admitted prior art (pages 1-4) and Park (U.S. 5,795,808), or Takeoka (U.S. 4,647,947) or Thomas (U.S. 4,920,071) and Ma (US 006207589 B1).

Claims 5-7, 18-20, 26-28, and 34-36 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 0060020024A) in view of admitted prior art and Park (U.S. 5,795,808), or Takeoka (U.S. 4,647,947) or Thomas (U.S. 4,920,071) and Ma (US 006207589 B1) as applied to claims 1, 14, 30, above, and further in view of Yano (US 005810923A).

Claims 8-10, 12-13, and 21 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 0060020024A) in view of Park (U.S. 5,795,808), or Takeoka (U.S. 4,647,947) or Thomas (U.S. 4,920,071) and Ma (US 006207589 B1) and in further view of Moise (US 006211035 B1) and Yano (US 005810923 A).

Claims 29 and 37 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 0060020024A) in view of admitted prior art and Park (U.S. 5,795,808), or Takeoka (U.S. 4,647,947) or Thomas (U.S. 4,920,071) and Ma (US 006207589 B1) and in further view of Moise (US 006211035 B1).

The various rejections state that Maiti discloses a zirconium layer (group IVB) layer deposited on a transistor body region by an evaporation technique that is oxidized to form an oxide layer. However, Maiti does not show evaporation depositing a substantially amorphous single element metal layer on the body region using electron beam evaporation. Applicant agrees with the Examiner that Maiti does not show a crystal structure that is amorphous.

The rejections further state that Ma discloses depositing a metal layer by “an evaporation method” and that “Ma teaches the layer remains amorphous (column 3, lines 54-55), thus the layer as formed is amorphous. Ma teaches that crystallinity (amorphous state) reduces electrical leakage (column 1, lines 53-58).”

Ma appears to show an evaporation deposition that includes heating a crucible at a temperature in a range of 1000 and 2000 degrees C (col. 2, lines 54-64). Ma does not appear to show electron beam evaporation. Ma also appears to show doping zirconium oxide with aluminum. “Doping, preferably with AL, reduces the leakage current, and increases the crystallization temperature of the gate dielectrics.” (col. 3, lines 45-47). Ma does not show evaporation depositing a substantially amorphous single element metal layer on the body region using electron beam evaporation. Ma uses an additional element (aluminum) to affect crystallinity. Applicant agrees with the Examiner that Park, Thomas, and Takeoka do not show a crystal structure that is amorphous.

In contrast, independent claims 1, 9, 14, 22, 30, and 51 include evaporation depositing a substantially amorphous single element metal layer on the body region using electron beam evaporation. Further, claim 55 includes electron beam evaporation depositing a substantially amorphous and substantially pure zirconium layer on the body region. Because the cited references, either alone or in combination, do not show every element of Applicant's independent claims, a 35 USC § 103(a) rejection is not supported by the references. Reconsideration and withdrawal of the rejection is respectfully requested with respect to Applicant's independent claims 1, 9, 14, 22, 30, 51, and 55. Additionally, reconsideration and withdrawal of the rejection

**AMENDMENT AND RESPONSE UNDER 37 CFR § 1.116 – EXPEDITED PROCEDURE**

Serial Number: 09/945535

Filing Date: August 30, 2001

Title: HIGHLY RELIABLE AMORPHOUS HIGH-K GATE OXIDE ZrO<sub>2</sub>

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is respectfully requested with respect to the remaining claims that depend therefrom as depending on allowable base claims.

**CONCLUSION**

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 373-6944 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

KIE Y. AHN ET AL.

By their Representatives,

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Date 2-9-04

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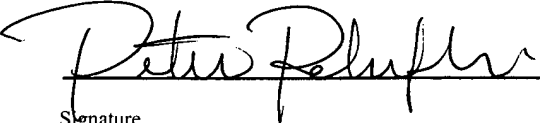
David C. Peterson

Reg. No. 47,857

**CERTIFICATE UNDER 37 CFR 1.8:** The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop RCE, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 9th day of February, 2004.

Peter Rebuffoni

Name



Signature